

haustion of the nervous power noticed in his time by Dupuytren, but which will remain always something very vague, very mysterious, and very contestable.

The cases in which we have observed what we should call consecutive deaths—a species of slow poisoning by chloroform, refer to operations performed upon old persons or upon subjects extremely debilitated. It was also at the end of those operations that we call “*siderantes*,” to show to what degree they act upon the general state of the powers and upon the entire economy; for example, operations for strangulated hernia, for the removal of large tumours from old and debilitated persons, and upon persons wounded with fire-arms. The number of these facts (still inconsiderable)—their doubtful interpretation—the coincidence of the employment of chloroform with an operation in itself very grave, impose upon us a great reserve, and do not permit us to form conclusions. These are suggestions which we submit to the consideration of practitioners; because we believe it our duty to do so at present, in order to awaken their attention to a cause of death so much the more formidable that it remained unperceived. Until more fully informed, we will admit the possibility of a slow or consecutive poisoning by chloroform.—*Lancet*, Feb. 21, 1857.

61. *Experiments on the Poisonous Properties of Nicotine and Strychnine.*—At a meeting of the Royal Irish Academy, Nov. 29, 1856, Professor HAUGHTON read the following account of some experiments on the poisonous properties of nicotine and strychnine:—

“I was induced to make the experiments which I now bring under the notice of the Academy, by the consideration of the specific actions of strychnine and nicotine upon the muscular system, which appeared to be so opposite in their character as to lead me to a conviction that they might prove to be, mutually, antidotes to each other’s action. It is generally believed that strychnine exerts a specific action upon the lower or lumbar portions of the spinal column, exciting the muscular system (at least the voluntary muscles) into a state of tetanic contraction, and ultimately producing death indirectly, by rendering respiration mechanically impossible, by virtue of the permanent contraction of the pectoral muscles; and not, as was once supposed, by its action upon the heart. It is also well known that the most powerful agent we possess for relaxing the action of the muscles is nicotine, whether administered in the form of tobacco smoke or infusion of the leaves. From these well-known facts I was led to believe that these powerful poisons might be used as antidotes to each other’s action, and with the view of testing this conjecture, I made the following experiments:—

“*First Experiment—Nicotine.*—A bath, consisting of 53 of water, holding dissolved 5 grs. of nicotine of sp. gr. 1012 was prepared, and in this mixture a frog was immersed; in fifty-six seconds the animal became narcotized and apparently incapable of motion; but on being excited and stirred, it was evident that life was not extinct, and the pulsation of the heart did not cease until twenty-three minutes after immersion. The anterior extremities became paralyzed first, accompanied with a quivering of the fore-legs, and then the hind-legs were drawn up so as to reduce the animal to the smallest possible compass. At the time of death, the belly and hind legs became suffused with a pink tint, which was rapidly diffused, commencing at the thighs. After death, the mouth remained closed, and the eye continued very brilliant and life-like, the pupil being apparently dilated.

“*Second Experiment—Nicotine.*—A solution of nicotine was formed, consisting of 5 grs. of nicotine to 203 of water, and a frog immersed as before, leaving his head above the water; in three minutes and a half he became quite paralyzed, as before, placing the fore-legs upon his back, with the palms upwards. Death finally ensued in forty-three minutes, with the same appearances as those described in the first experiment.

“*Third Experiment—Strychnine.*—In this experiment, 5 grs. of pure strychnine were dissolved in a minimum of muriatic acid, and 53 of water added; a frog was placed in the bath thus formed, with the following results: Tetanic convulsions set in immediately upon his touching the liquid, and continued

while life remained; there was no sign of opisthotonos, but strongly marked emprostotonos. The animal was quite dead in four minutes, mouth open, and eye closed and death-like; the whole body stretched out and bent forwards, the back being highly arched.

"*Fourth Experiment—Strychnine.*—A bath was made of 5 grs. of strychnine and 20 $\frac{3}{4}$  of water, and a frog placed in the solution, as before. The animal became speedily convulsed, and exhibited the symptoms as in the former case; but in this case death did not finally take place until after an interval of forty-five minutes. The mouth was open, the eye closed, and the body arched, and bent forward as before.

"*Fifth Experiment—Nicotine and Strychnine.*—In this experiment two baths were prepared, one of 5 grs. of strychnine to 5 $\frac{3}{4}$  water, and the other 5 grs. nicotine to 5 $\frac{3}{4}$  of water, and the two solutions carefully mixed together. A frog was now introduced, and remained apparently without inconvenience for nineteen minutes, when the strychnine began to operate, and then first tetanic convulsions appeared; the usual appearances of strychnine poisoning continued, but with less violence than in the former experiments. After forty-seven minutes the animal was removed from the bath and washed with cold water; he lived afterwards for upwards of twenty-four hours, exhibiting at intervals tetanic convulsions.

"*Sixth Experiment—Nicotine and Strychnine.*—Another frog was placed in a mixed bath of nicotine and strychnine of the same strength as that last described, and removed after an interval of ten minutes; after removal in thirty-two minutes, the first symptom of emprostotonos appeared, and the convulsions continued for many hours, but the animal ultimately recovered completely, and is still in the enjoyment of health and life, after the lapse of many days.

"The last two experiments appear to me conclusive as to the action of nicotine in retarding, and, in certain cases, completely counteracting the effects of strychnine.

"In the fifth experiment, a frog had lived for forty-seven minutes in a mixture of two solutions, of which one would have destroyed life in four minutes, and the other would have produced paralysis in one minute, and destroyed life in twenty-three minutes; and yet, in the mixture, the animal lived forty-seven minutes, and afterwards for twenty-four hours. In the sixth experiment, the frog, immersed in a similar mixture of the poisons for ten minutes, had ultimately recovered, the effect of the strychnine being completely obviated by the action of the nicotine. I consider that these facts, which have come under my notice, give rise to much interesting speculation, into which, however, I have no desire to enter, as I prefer leaving such topics to those who are more immediately concerned in them. I hope that further inquiries will be instituted into the action of strychnine and nicotine upon some of the warm-blooded animals, as I believe that in nicotine, which is always easily procurable in the form of tobacco-leaf infusion, will be found a valuable antidote in at least some cases of strychnine poisoning, whether intentional or accidental."—*Dublin Hospital Gazette*, Dec. 8, 1856.

62. *Effects of Tartar Emetic upon the Muscular System whilst under the influence of Strychnia.*—Dr. JOHN H. POWER communicated the following case to the Surgical Society of Ireland (Dec. 13, 1856), which has an important bearing on the subject of poisoning by strychnia.

"Anne Clive, a young woman, was admitted into the Richmond Hospital for a nervous affection of the extensor muscles of the forearms. The flexor muscles were in a state of contraction. The hand was clenched. She was ordered the sixteenth of a grain of strychnia and two grains of compound rhubarb pill in one pill every sixth hour. She stated that she took about thirty pills. On the morning of the 30th May, 1843, she stated that she had a confused feeling in her head, indistinct vision, and that she could not walk. She then had a general jerking of the muscular system; the lumbar mass acted violently, resembling opisthotonos. There was corrugation of the forehead, with peering of the eyes, flushing of the face, and dilatation of the pupils.